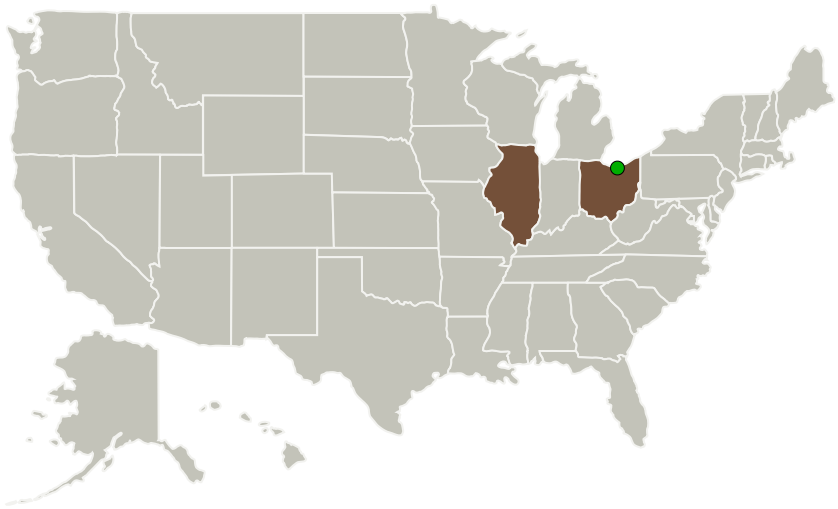
CubeSat High Impulse Propulsion System (CHIPS), Phase I

Completed Technology Project (2013 - 2013)

Project Introduction

CU Aerospace proposes the ground test validation of a nanosat primary propulsion subsystem using non-toxic propellant with 3-axis ACS for orbit change and/or de-orbit capability, precision maneuvering, and drag makeup. Our approach, called the CubeSat High Impulse Propulsion System (CHIPS), leverages the existing Micro Propulsion System (MiPS) thruster technology development by our team partner VACCO Industries and enhances it with the CU Aerospace very high efficiency warm gas variant of an innovative resistojet that significantly boosts the performance of standard cold-gas systems. The MiPS system has been tested to 200,000 cycles without any technical issues, demonstrating excellent reliability. The 1.5U CHIPS subsystem, using non-toxic proprietary EP-76 propellant, is a compact thruster system having a total impulse of 602 N-s and a fully throttleable thrust of 50 mN. The subsystem also includes an EP-76 3-axis cold-gas attitude control system. Approximately 25 W of primary power is required from a battery included in the 1.5U package. The value of this technology is that this low cost subsystem demonstration will pioneer a family of nanosat propulsion systems, based upon an innovative warm gas system and propellant, which will become available to the CubeSat and nanosatellite community for a broad range of propulsion needs.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

CU Aerospace, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Continued on following page.

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
CU Aerospace, LLC	Lead Organization	Industry	Champaign, Illinois
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Illinois	Ohio

Project Transitions

May 2013: Project Start

November 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140454)*

Images

Project Image

CubeSat High Impulse Propulsion System (CHIPS)
(https://techport.nasa.gov/image/135929)

Project Management *(cont.)*

Principal Investigator:

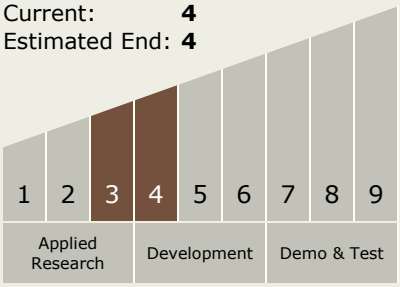
David L Carroll

Co-Investigator:

David C Carroll

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.7 Cold Gas

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System